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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,683	05/26/2006	Ryuji Kobayashi	8028-1160	4993
466 7590 12/06/2007 YOUNG & THOMPSON 745 SOUTH 23RD STREET 2ND FLOOR ARLINGTON, VA 22202			EXAMINER NIU, XINNING	
			ART UNIT 2828	PAPER NUMBER
			MAIL DATE 12/06/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/580,683

Applicant(s)

KOBAYASHI, RYUJI

Examiner

Xinning(Tom) Niu

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 9-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>05/26/2006</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 9-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Y. Sakata et al. "All-Selective MOVPE-Grown 1.3-um Strained Multi-quantum-Well Buried-Heterostructure Laser Diodes," IEEE Journal of Quantum Electronics, Vol. 35, No. 3, March 1999 in view of S. L. Chuang. Physics of Optoelectronic Devices. New York: John Wiley & Sons, 1995.

4. Regarding claim 9, Sakata et al. disclose: a double hetero mesa stripe serving as a first semiconductor laminated product including at least strained multiple quantum well

active layer formed by selective growth on a semiconductor substrate (Figure 1, page 369, Col 2, page 370, Col 1); and recombined layers (the two other mesa stripe layers on either side of the middle active layer) serving as second semiconductor laminated products simultaneously formed on both sides of the double hetero mesa strip at a predetermined interval in the selective growth (Figure 1, page 369, Col 2, page 370, Col 1), both equation 1 which deals with the average strain of multiple layers and equation 2 which deals with critical thickness are inherent to a strained semiconductor layers.

Sakata et al. do not disclose: average strain amount of double hetero mesa stripe is a compression strain and an average strain amount of the recombination layer is a tensile strain. However, Chuang discloses: compressively strained and tensile strained quantum well lasers (page 437-444), specifically compressively strained quantum well structure achieves a lower threshold current density (page 437) and favors TE polarization (page 444), while tensile strained quantum well active layers favors TM polarization (page 444). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the laser of Sakata et al. by compressively staining the mesa stripe in order to achieve a lower threshold current and to tensile strain the recombination layers in order to emit coherent light with TM polarization.

5. Regarding claim 10, Sakata et al. disclose: selective growth layers includes at least an optical confinement layer and a quantum well active layer (page 370, Col 1).

6. Regarding claim 11, Sakata et al. disclose: InGaAsP active layer and InGaAsP optical confinement layers. Sakata et al. do not disclose: selective growth layers contains AlInAs or AlGaInAs. It would have been obvious to one having ordinary skill in the art at the time the invention was made to change the material in order to change the output wavelength, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

7. Regarding claim 12, Sakata et al. disclose: InGaAsP active layer and InGaAsP optical confinement layers. Sakata et al. do not disclose: selective growth layers contains AlInAs or AlGaInAs. It would have been obvious to one having ordinary skill in the art at the time the invention was made to change the material in order to change the output wavelength, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

8. Regarding claim 13, Sakata et al. disclose: distance between the double hetero-mesa stripe and the recombination layer (Figure 1, see rejection for claim 1). Sakata et al. do not disclose distance between the double hetero-mesa stripe and the recombination layer is 15  $\mu\text{m}$  or less. It would have been obvious to one having

ordinary skill in the art at the time the invention was made to modify the distance between the mesa stripe and the recombination layers, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

9. Regarding claim 14, Sakata et al. disclose: forming a pair of stripe shaped dielectric masks on a semiconductor substrate, a double hetero mesa stripe serving as a first semiconductor laminated product including at least strained multiple quantum well active layer formed by selective growth on a semiconductor substrate (Figure 1, page 369, Col 2, page 370, Col 1); and recombined layers (the two other mesa stripe layers on either side of the middle active layer) serving as second semiconductor laminated products simultaneously formed on both sides of the double hetero mesa strip at a predetermined interval in the selective growth (Figure 1, page 369, Col 2, page 370, Col 1), both equation 1 which deals with the average strain of multiple layers and equation 2 which deals with critical thickness are inherent to a strained semiconductor layers. Sakata et al. do not disclose: average strain amount of double hetero mesa stripe is a compression strain and an average strain amount of the recombination layer is a tensile strain. However, Chuang discloses: compressively strained and tensile strained quantum well lasers (page 437-444), specifically compressively strained quantum well structure achieves a lower threshold current density (page 437) and favors TE polarization (page 444), while tensile strained quantum well active layers favors TM

polarization (page 444). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the laser of Sakata et al. by compressively staining the mesa stripe in order to achieve a lower threshold current and to tensile strain the recombination layers in order to emit coherent light with TM polarization.

10. Regarding claim 15, Sakata et al. disclose: selective growth layers includes at least an optical confinement layer and a quantum well active layer (page 370, Col 1).

11. Regarding claim 16, Sakata et al. disclose: InGaAsP active layer and InGaAsP optical confinement layers. Sakata et al. do not disclose: selective growth layers contains AlInAs or AlGaInAs. It would have been obvious to one having ordinary skill in the art at the time the invention was made to change the material in order to change the output wavelength, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

12. Regarding claim 17, Sakata et al. disclose: InGaAsP active layer and InGaAsP optical confinement layers. Sakata et al. do not disclose: selective growth layers contains AlInAs or AlGaInAs. It would have been obvious to one having ordinary skill in the art at the time the invention was made to change the material in

order to change the output wavelength, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

13. Regarding claim 18, Sakata et al. disclose: distance between the double hetero-mesa stripe and the recombination layer (Figure 1, see rejection for claim 1). Sakata et al. do not disclose distance between the double hetero-mesa stripe and the recombination layer is 15  $\mu\text{m}$  or less. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the distance between the mesa stripe and the recombination layers, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xinning(Tom) Niu whose telephone number is 571-270-1437. The examiner can normally be reached on M-T, 7:30-5:00 EST, Alternate Fridays 7:30-4:00 ES.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Min Sun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Xinning Niu  
11/29/2007

